10/541036

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S PD<=031230 AND ANGLE? AND (SIMULAT? (S) SENS?) AND (TEST? (S) CONTROL? (S) (VESSEL

Your SELECT statement is:
   S PD<=031230 AND ANGLE? AND (SIMULAT? (S) SENS?) AND (TEST? (S) CONTROL?
(S) (VESSEL? OR SHIP? OR BOAT?))

           Items   File
           -----   ----
>>>File 14 processing for PD=  : PD=031230
>>>File 14:     started at PD=APR.0000 stopped at PD=19830300
               1    14: Mechanical and Transport Engineer
                        Abstract_1966-2006/Sep
>>>File 34 processing for PD=  : PD=031230
>>>File 34:     started at PD=15 stopped at PD=20011011
               2    34: SciSearch(R) Cited Ref Sci_1990-2006/Sep W4
>>>File 63 processing for PD=  : PD=031230
>>>File 63:     started at PD=DATED stopped at PD=19680517
               1    63: Transport Res(TRIS)_1970-2006/Aug
       Examined  50 files
>>>File 324 processing for PD=  : PD=031230
>>>File 324:     started at PD=19650805 stopped at PD=20030821
>>>File 324 processing for SENS? stopped at SENSORGEHAEDSE
>>>File 324 processing for TEST? stopped at TESTPROBLEM
               5   324: German Patents Fulltext_1967-200638
>>>File 340 processing for PD=  : PD=031230
>>>File 340:     started at PD=19490329 stopped at PD=19840705
               1   340: CLAIMS(R)/US Patent_1950-06/Sep 28
Processing
>>>File 348 processing for PD=  : PD=031230
>>>File 348:     started at PD=78 stopped at PD=960103
>>>File 348 processing for SENS? stopped at SENSORANSTEUERZEITSIGNAL
>>>File 348 processing for TEST? stopped at TESTFERNLEITUNG
               1   348: EUROPEAN PATENTS_1978-2006/ 200638
>>>File 349 processing for SENS? stopped at SENSIERUNQ
>>>File 349 processing for TEST? stopped at TESTERGEBNISSEN
>>>File 349 processing for CONTROL? stopped at CONTROLLEF
               4   349: PCT FULLTEXT_1979-2006/UB=20060928UT=20060921
              57   652: US Patents Fulltext_1971-1975
Processing
Processing
>>>File 654 processing for PD=  : PD=031230
>>>File 654:     started at PD=A stopped at PD=19821124
>>>File 654 processing for SENS? stopped at SENSORSS
>>>File 654 processing for TEST? stopped at TESTI20401280
              28   654: US Pat.Full._1976-2006/Sep 28

   9 files have one or more items; file list includes 80 files.
   One or more terms were invalid in 52 files.

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SHOW FILES
File  14:Mechanical and Transport Engineer Abstract 1966-2006/Sep
         (c) 2006 CSA.
File  34:SciSearch(R) Cited Ref Sci 1990-2006/Sep W4
         (c) 2006 The Thomson Corp
File  63:Transport Res(TRIS) 1970-2006/Aug
         (c) fmt only 2006 Dialog
File 324:German Patents Fulltext 1967-200638
         (c) 2006 Univentio
File 340:CLAIMS(R)/US Patent 1950-06/Sep 28
         (c) 2006 IFI/CLAIMS(R)
File 348:EUROPEAN PATENTS 1978-2006/ 200638
         (c) 2006 European Patent Office
File 349:PCT FULLTEXT 1979-2006/UB=20060928UT=20060921
         (c) 2006 WIPO/Thomson
File 652:US Patents Fulltext 1971-1975
         (c) format only 2002 Dialog
File 654:US Pat.Full. 1976-2006/Sep 28
         (c) Format only 2006 Dialog
?
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Set	Items	Description
S1	100	PD<=031230 AND ANGLE? AND (SIMULAT? (S) SENS?) AND (TEST? - (S) CONTROL? (S) (VESSEL? OR SHIP? OR BOAT?))
S2	100	RD (unique items)
S3	6	S1 AND ((ROLL? AND PITCH?) (2N) ANGLE?)

T S3/3,KWIC/1-6

3/3,KWIC/1 (Item 1 from file: 652)
DIALOG(R)File 652:US Patents Fulltext

00776699
Utility
CONTROL SYSTEM MONITOR AND FAULT DISCRIMINATOR

PATENT NO.: 3,902,051
ISSUED: August 26, 1975 (19750826)
INVENTOR(s): Betten, Carl B., Seattle, WA (Washington), US (United States of America)
ASSIGNEE(s): The Boeing Company, (A U.S. Company or Corporation), Seattle, WA (Washington), US (United States of America)
Assignee Code(s): 10208
APPL. NO.: 5-478,923
FILED: June 13, 1974 (19740613)
FULL TEXT: 318 lines

PATENT NO.: 3,902,051
ISSUED: August 26, 1975 (19750826)

...therefore, go by undetected. For example, assume that a hydrofoil flying at its maximum bank angle of -16 degree(s) is commanded to roll to its opposite limit of +16 degree...
...fail hard over to -26 degree(s) during a turn at -16 degree(s) bank angle , the resulting error would be only +10 degree(s) and could not be detected by...
... particularly to FIG. 1, the invention is shown in connection with a servo system for controlling the flaps of a hydrofoil ship ; however it should be understood that the invention has application to any servo system. A roll angle command signal is applied to a summing amplifier and compensating network 12. The output of...

...the servo system, is applied to a mechanical actuator 14 which, in turn, actuates the control surface or flap 16 on the foil 18 of a hydrofoil ship . Normally, in a roll control system for a hydrofoil ship , there are at least two control surfaces 16, one on the portside and one on the starboard side of the ship in order that any rolling motion can be compensated for. However, only a single control flap and servo system therefor are shown herein for purposes of simplicity.

The mechanical motion of the control flap 16 is converted through a mechanical linkage 20 and transducer 22 into a corresponding...

... amplifier 12, the arrangement being such that when the output of the transducer matches the roll angle command signal, movement of the control flap by the actuator 14 will cease, all in accordance with usual servo system practice.
The control system monitor of the invention is enclosed by broken lines in FIG. 1 and identified...

... 12 is applied to a reference signal shaping network 28 which acts to convert the control system command signal into a reference signal whose relation to the control system error signal is well defined so that it can be meaningfully compared with the...

... the comparators can be utilized to automatically disconnect or disable

the servo system for the control surface 16 or can be used to actuate an automatic landing procedure in auto-land system 36.

In applying the control system monitor of the invention to a specific control system, it is necessary to select a reference signal shaping network 28 which yields a reference signal with a relatively well defined relation to the control system error signal as explained above. Secondly, it is necessary to obtain by test or simulation , trajectories of the error signal versus the reference signal for the full range of system...

...corrective action.

The foregoing procedure will now be described for the case of a roll control system for a hydrofoil craft. As was mentioned above, the choice of the shaping network 28 depends on the nature of control system error signal. In this example, the roll control system has a significant amount of integration in the forward path and the error signal...

... applied to the comparator group 29 is an approximate (i.e., delayed) analog of the control system command.

Trajectories of error signal versus reference signal are shown in FIG. 2 for the case of a roll control system for a hydrofoil craft. The solid curve in the lower portion of FIG. 2 represents the response of the error channel to a full scale change in roll angle command from +16 degree(s) to -16 degree(s), where the error signal is plotted...

... against the reference signal. The upper broken curve shows the corresponding response in the opposite sense . That is, the lower solid curve represents the starboard-to-port roll response; while the...however each additional line segment will require an additional comparator device.

A comparison of the control system monitor of the present invention with a hard-over failure detector of the type...
... in the introductory part of this specification is given in FIG. 3. In the roll control system example given, the absolute magnitude of roll error during fault-free operation is assumed...

... are both zero, the two error detectors work equally well. However, at a commanded bank angle of -16 degree(s), for example, the 10 degree(s) error value on the gyro...

...reference numerals. In this embodiment, however, an error signal shaping network 46 has been added. Control systems with considerable differentiation in the forward path, or high gain control loops subject to frequent large inputs, may operate with the error channel saturated a significant...
... of a plot of error signal versus reference signal, each discrimination line being at an angle with respect to the X-Y axes of the plot to completely enclose said trajectory...

3/3,KWIC/2 (Item 2 from file: 652)
DIALOG(R)File 652:US Patents Fulltext

00735557
Utility
SHIP-BORNE GRAVITY STABILIZED ANTENNA

PATENT NO.: 3,860,931
ISSUED: January 14, 1975 (19750114)
EXTRA INFO: Assignment transaction [Reassigned], recorded May 31, 1988 (19880531)
INVENTOR(s): Pope, Donald Geoffrey, Lilley Bottom, GB (United Kingdom). England
Kirkby, Rodney John, Chesham, GB (United Kingdom).England
ASSIGNEE(s): The Post Office, (A Non-U.S. Government Entity), London, GB (United Kingdom)England
Assignee Code(s): 67282|
APPL. NO.: 5-418,908
FILED: November 26, 1973 (19731126)
FULL TEXT: 348 lines

PATENT NO.: 3,860,931
ISSUED: January 14, 1975 (19750114)

At sea, in anything other than a flat calm, a ship undergoes a fluctuation which can be resolved into periodic components of motion. The significant fluctuations...

...longitudinal axis and sway is a beam-wise translational fluctuation.

Referring to FIG. 1, the ship as indicated at 10 is at one extreme of its sway movement, i.e., it...

... point, its acceleration is in the direction of arrow 12. Sway, which arises when the ship is in a beam-sea with the waves meeting it side-on, is caused partly by the tendency of the ship to slide down the wave and partly by the circular motion of the water in the wave, and occurs in association with rolling of the ship so that by the time the ship passes through the plane 11, it has taken up an attitude as indicated at 13. By the time the ship has reached its other extremity of sway as indicated at 14, it is again substantially...

...extremity it is subject to an acceleration in the direction of arrow 15.

When the ship is in the position indicated at 10, its roll is in the direction of arrow...

...is in the direction of arrow 17.

Any pendulously mounted structure in or on the ship will be subjected to torques by the fluctuating motions of the ship , and from FIG. 1 it is clear that both roll and sway will simultaneously give torques in the same direction, i.e., with the ship in position 10, the torques due to both sway and roll will be in the...

...will both be in the direction of arrow 19. The roll and sway of the ship will thus combine to excite the pendulous structure into fluctuant motion.

Further, unless the pendulous structure is pivotally mounted about the roll-centre of the ship , that is to say the line about which the ship rolls, the roll of the ship will cause the pendulous structure to have an additional beam-wise translational fluctuation.

The amplitude of fluctuations induced in the pendulous structure by the sway of the ship can be reduced by providing a frictional damping torque at its pivot. This would, however, increase the coupling between angular

movement of the pendulous structure and angular movement of the ship so that the amplitude of fluctuation induced in the pendulous structure by the roll of the ship would be increased. It is therefore necessary to seek some means, other than controlling the pivot friction, which will limit the sway-induced fluctuation without simultaneously increasing the roll...

... period of oscillation if the amplitudes of fluctuations induced therein by the motion of the ship are to be limited.

The required limitation on the amplitude of fluctuation of a gimballed...

... 2, the line 20 represents the actual orientation of a communications satellite relative to the ship and the line 21 represents the orientation of the antenna, at one extreme limit of its angular oscillation. The angle A is the allowable angular stability of the antenna, the angle B is the beamwidth of the antenna to the 3 dB points and angle C is an angular tolerance obviating the need for continuous resetting of the antenna pointing direction. A fast ship steaming on a great circle route can travel every hour through a distance large enough for the orientation of a geo-stationary satellite relative to the ship to change by as much as 1 degree(s) per hour. It is assumed that...
... estimating the required stability of the antenna. In other words, it is assumed that the angle C equals 5 degree(s).

From the geometry of FIG. 2: A = (B-5)/2...

...an antenna is +- 5 degree(s).

It can be shown by means of a computer simulation that this degree of stability can be achieved with an antenna orientation arrangement in the...

...the structure from the pivot, ML = 4 kg m,

Total Coulomb friction torque between the ship and the antenna platform system, T = 1.5 Nm.

An antenna arrangement with parameters of...

... values will achieve the desired stability of +- 5 degree(s) when borne on a cargo ship of 14,000 tons dead weight, beam-on to the prevailing sea in a Beaufort...of an up-standing arm 26. Elevation directing means in the form of a remotely controlled electric motor indicated at 35a is provided for rotating the dish 24 about the pivot...
... mounted upon a platform 28 and azimuth directing means in the form of a remotely controlled electric motor 35b is provided for rotating the antenna assembly about an axis normal to...

... antenna assembly about a generally vertical axis. The azimuth directing means is coupled to the ship 's compass and thereby controls the bearing of the antenna to compensate for yaw and changes of course.

The platform...

... of a universal joint assembly 29 upon some rigid part of the structure of the ship indicated at 30. The part 30 may be a mast or may be part of ...

... of orthogonal axes arrange to lie respectively parallel to the major horizontal axes of the ship , i.e., the longitudinal (ahead/astern) axis and the beam-wise axis. However it will...

... arrangement is such that the antenna may be stabilized to within +- 5 degree(s) for ships ranging from trawlers to tankers in virtually in all sea conditions. This degree of stability would enable the ship to use an antenna as large as a 1 m diameter dish, which is considered to be a sensible upper size limit for antenna to be fitted in a suitable position to the majority of ocean-going vessels . Even if the full theoretical stability cannot be realized in practice, stabilization to within about...

... of the radome, and hence the cost of the assembly, can be reduced. If the ship is subject to periodic motions ...the period of such motions will either be so short (e.g., vibration from the ship 's engines) as to have an insignificant effect upon the stability of the arrangement or...

...leads 36 to be negligible.

FIG. 5 shows a gimballed platform assembly which has been tested . The platform comprises a bearing housing 37 and four weighted arms 38 extending therefrom. The...

... which is adapted to be rigidly secured to some part of the superstructure of a ship . One link of the joint is secured to the upper end of the stanchion 11...

... antennae of differing size and form or, where desired, to balance the platform alone. As tested , a spacer was used which located the center of gravity of the assembly 0.75...
... needle roller bearings of about 11 mm nominal diameter. The moment of inertia of the tested assembly was a little over 29 kg m sup 2.

In the tests the stanchion 11 was secured on the flying bridge of an unstabilized ship of approximately 1,450 tons deadweight fitted with a gyro-horizon device giving an accurate...

... instantaneous roll and pitch of the platform relative to the true horizontal plane. The instantaneous angles of roll and pitch of the platform were subsequently combined vectorially to give the absolute angle or "tilt" of the platform at each instant. The tilt angles were subjected to statistical analysis and a histogram was plotted.

The histogram shows that the platform tilt angle exceeded +- 5 degree(s) for only 0.15 percent of the time during which results...

...truer indication of the stabilizing effect is given by the fact that, in pitch, the ship exceeded +- 5 degree(s) for 0.13 percent of the time while the pitch (that is, fore and aft) angle of the platform exceeded +- 5 degree(s) for only 0.05 percent of the time. Further, whilst the pitch angle of the ship exceeded +- 10 degree(s) for 0.015 percent of the time, the pitch angle of the platform exceeded +- 10 degree(s) for only 0.001 percent of the time. It is apparent that the platform was markedly more stable than the ship .

A subsequent examination of the tested assembly showed that the friction in the bearings of the universal joint was greater than...

...employment of a universal joint of the constant velocity type. The joint used in the tests was of the form known as a Hooke's joint and thus was not of...

3/3,KWIC/3 (Item 3 from file: 652)
DIALOG(R)File 652:US Patents Fulltext

00720190
Utility
APPARATUS FOR AUTOMATIC DYNAMIC POSITIONING AND STEERING SYSTEMS

PATENT NO.: 3,844,242
ISSUED: October 29, 1974 (19741029)
INVENTOR(s): Sernatinger, Franz, Mornac, FR (France)
Abad, Maurice, L'Isle D'Espagnac, FR (France)
ASSIGNEE(s): Etat Francais, (A Non-U.S. Company or Corporation), Paris, FR (France)
Assignee Code(s): 31966
APPL. NO.: 5-290,516
FILED: September 20, 1972 (19720920)
PRIORITY: 71.33836, FR (France), September 21, 1971 (19710921)
FULL TEXT: 458 lines

PATENT NO.: 3,844,242
ISSUED: October 29, 1974 (19741029)

...INVENTION
The present invention relates to automatic dynamic positioning and steering systems intended for surface ships and submarine craft and the like.

BACKGROUND

It is known that dynamic positioning consists of maintaining a ship in a given position and heading and, also at a determined immersion when a submarine...

... with one of such propellers being located forward and the other aft on the associated ship . Another means which is used consists of housing propellers delivering adjustable and reversing thrust in tunnels running through the ship in the vicinity of its bow and stern, respectively, permitting application of a lateral thrust...

... one or more propellers located at the rear, these propellers also permitting displacement of the ship between positioning stations.

The position in the horizontal plane is sensed with respect to a...

... system such as a sonar or ultrasonic transponder beacon, or a cable stretched between the ship and a mooring placed on the bottom, the slanting angle of which is measured with respect to the vertical.

The vehicle direction is measured with...

...Z sub o for the immersion.

Any change in these reference values signifies the associated ship 's displacement and represents a steering function.

The propeller control from the comparision of the reference values with those measured by the position pick-offs...

... In addition, the reception is affected by noises coming, for example,

from the propellers and ship 's movements.

The compromise which is then sought for in order to determine the corrector...

... consumption while featuring poor performance characteristics under transient conditions.

In addition, important changes in the ship 's response to applied forces may occur for various reasons: variations in weight and center...

... volume varying as the pressure; and propeller thrust hydrodynamically deviated by current. Such changes in ship 's response make it necessary to further reduce the performance characteristics or to leave at the operating personnel's disposal adjustment controls for the said networks in order to maintain normal servo-system stability margins, thereby increasing...

...first result whatever the type of position pick-off used and in spite of important ship or craft weight variations.

Another object of the invention is to facilitate steering.

The automatic...

... lateral and vertical accelerations, respectively. The last measurement is obviously not essential when a surface ship is concerned.

An angular accelerometer generates a signal proportional to the angular acceleration in heading.

Generally, a ship is hydrodynamically stable in rolling and in pitching and does not incorporate any servo-system...

... issuing from such accelerometers are reinjected to the associated servo-system inputs in order to control the propellers and thus achieve an accelerometer feedback. This feedback imposes a propeller thrust which ...pick-off.

A channel is known as an anticipation channel, thus called because it applies control signals to the propellers which are generated before the pick-offs previously described have been...

... proportional to the disturbances computed from known relations, which voltages are applied to the propeller control to obtain the appropriate thrusts in opposite directions.

With the disturbances thus compensated for by...

... between the actual disturbances and the computed disturbances since the formulae deducted from model basin testing for instance are not always actually rigorous. However, dynamic and static positioning errors will be substantially reduced.

This system has been improved by assigning an amplitude schedule to the propeller control signals which is the inverse of the propeller thrust response so that the resulting thrust...

... theory of the servo-systems. For this purpose, periodic signals are applied to the propeller control with quite a low amplitude in order to avoid interfering with equipment operation. The accelerometers...

... and moment C about axis zz' perpendicular to the preceding ones and passing through the ship 's center of gravity O.

f.sub.x = F.sub.x

f.sub.y1 = 1...

...a linearized curve between 28 and 29. As the propeller thrust is applied to the ship 's inertia, it results that the ship 's inertia acceleration, for slow movements and below the limitation threshold is proportional to the...

... then also mounted linear accelerometer 34 oriented along axis yy' and angular accelerometer 35 the sensitive axis of which is parallel to axis zz'.

Generally, this platform cannot be placed in the center of rotation which is also the "quiet point" of the ship . As a result, during rolling and pitching movements, a tangential acceleration occurs on the platform...

... above the quiet point at a distance d (distance between the accelerometer platform deck and ship 's center of rotation), the equations expressing the disturbances are greatly simplified.

According to the... accelerations resulting from the angular movements onto the axes of a trihedron related to the ship with the platform installed in the manner described above.

These components are projected into the...

...compared with the angular acceleration. In addition, the rolling rate is in quadrature with the rolling angle , likewise the pitching rate is in quadrature with the pitching angle and this pitching angle does not exceed but a few degrees. According to the simplified formulae, the spurious accelerations...

... to the conventional methods of computation for the servo-systems and obviously depend on the ship 's transfer function. The acceleration channel gain in open loop being G, the known formula giving the acceleration taken by the ship 's weight under the influence of a disturbing force F sub p is:

.GAMMA. = F...

...p /M (1 + G)

The acceleration loop has thus the effect of artificially multiplying the ship 's inertia by (1 + G) for small movements and in the band width of the accleration loop, proportionally reducing ship 's inertia and sensitivity to disturbances. In addition, the thrust linearization action by item 11 is completed by the...

... used if necessary to obtain the position deviation components in the trihedron related to the ship when the position pick-off reference system in use is different. Corrector network 21 filters...

... 23 is applied to the servo-system. This potentiometer is hand-driven through a manual control 24 and is automatically reset to zero which enables the adjustment of the propeller thrust...

...the order of a few percent of the maximum value is sufficient to cause a ship 's movement detectable by the accelerometer without impeding the operation in any manner.

The measured...
... pass filters 55 and 56, in-phase component u and quadrature component v of the ship 's movement are obtained, respectively. This mode of detection performs the correlation operation and removes...adjustment resistors 60 and 61, respectively, with the deviations amplified by 62 and 63 to control in the suitable direction the gain of the linear unit placed according to the preceding...

... pick-off output signals are applied to the circuit assembly designated by component 26 which simulates physical system 13 (the whole of the surfaces of the superstructures and hull subject to...

...where rho is the air density, S sub v is a reference surface of the ship 's emerged part and L is the ship 's length, C sub xv, C sub yv and C sub lv are the aerodynamic...

... express the effects of current on the immersed part, with the hydrodynamic coefficients determined from testing on a model in a model basin. The swell influence is more complex but the average thrust can be approximated by relations of same form deducted from model basin testing .

FIG. 11 shows a construction diagram of assembly 26. This analog simulation enables the anticipation term generation process to be well illustrated but it is obviously not...

...2 rho S sub v V sub v sup 2. Resolver 65 driven by an angle psi sub v multiplies this voltage by cos psi sub v on the one hand...

... not strictly constant but vary as direction psi sub v. Here, they are generated from angle psi sub v by analog function generators 70, 71 and 72, respectively, which reproduce the curves deducted from model testing .

The same operations are performed from parameters concerning current and swell by sub-assembly 76...

... which are respectively applied to adder 12 in each of the channels. The propellers so controlled then oppose equivalent disturbances F sub xp, F sub yp and C sub p applied to the ship .

Computation of external disturbing forces therefore permits the determination in an advantageous manner of the...

... output from the resolver represents total disturbance module F sub p, the angular position being angle psi sub p. Now, it is known that the thrust exerted by the wind or current is minimum when the ship is headed into this wind or current. This condition is met by using as the...

... system, which is subject of the invention, can be used in all cases where a ship has to maintain a predetermined position solely by means of its propellers. A particularly interesting application concerns off-shore drilling ships and oceanographic ships . It can also be applied to submarine wreckage searching craft or to submarine craft operating...

...or contact maneuvers.

These steering qualities are also interesting for maneuvering and drawing alongside large ships and especially alongside giant tankers.

3/3,KWIC/4 (Item 4 from file: 652)
DIALOG(R)File 652:US Patents Fulltext

00671808
Utility
THREE DIMENSIONAL RADAR TRANSPONDER SYSTEM

PATENT NO.: 3,783,447
ISSUED: January 01, 1974 (19740101)
INVENTOR(s): Sanders, Robert W., San Diego, CA (California), US (United States of America)
ASSIGNEE(s): The United States of America as represented by the Secretary of the Navy, (A U.S. Government Agency), Washington, DC (District of Columbia), US (United States of America)
Assignee Code(s): 86584|
APPL. NO.: 5-291,120
FILED: September 21, 1972 (19720921)
FULL TEXT: 191 lines

PATENT NO.: 3,783,447
ISSUED: January 01, 1974 (19740101)

ABSTRACT

... given range, elevation and azimuth when the radar uses a specific beam to determine the angle of elevation of the target above the horizon. ...delayed transponders reply is generated at the end of the pre-set count. Height is simulated by transmitting the delay pulse on a predetermined frequency that corresponds to that utilized by...

... to the normal is frequency dependent. The shipboard portion of the system is utilized to sense both the ship's attitude and antenna position, solve the trigimetric relationship and transmit this...
... is necessary to establish the exact coordinates of the mobile station with respect to the control station other tracking stations may be utilized such as tracking stations 14 and 16.

The major sub-assembly aboard the ship 10 consists of the ship 's attitude converter 18, data converter 20 and data transmitter 22. Attitude converter 18 converts the ship 's attitude in pitch roll and ship 's antenna position to digital form. A voltage representing the product of the cosine of the angle generated by the vector voltage representing position of the ship 's antenna with respect to the ship and the vector voltage representing the ship 's attitude are combined and appear in digital form in data converter 20 and this signal is transmitted to the station 12 via data link 24. For example, the ship 's attitude can be represented in three dimension as shown in FIG. 3 with the...

... Y axis representing magnitude of pitch and roll with the X axis also representing the ship 's heading. Vector A represents the ship 's relative displacement from the normal to the horizon and is shown by the angle . The vector B is the resultant vector of the pitch and roll ; the angle theta is the angle with respect to the ship 's heading. Vector C is the vector representing the ship 's antenna position as it rotates with respect to the ship 's own heading. Angle alpha is the angle generated as the ship 's antenna rotates with respect to the ship 's attitude vector. As the angle alpha develops the magnitude of vector B will vary with the ship 's attitude; therefore if by multiplying the magnitude of vector B by the cosine of angle alpha a voltage can be developed which is directly related to the ship 's attitude at any given instant with respect

to the antenna's position. This information...

...via data link 24. It is necessary to know the magnitude and direction of the ship 's displacement with respect to the horizon and the instant the ship 's three dimensional radar is looking at the transponder. Utilizing the tracking stations 14 and 16 the ship 's true heading and position with respect to the transponder is known at the instant...

... at the fixed station 12 which when evaluating a three dimensional radar position on a ship is positioned on the shoreline with the ship being positioned within radar range off the coast. When the ship 's attitude information is received at receiver 26 it is converted by data converter 28 ...

... converter 28 is used to modify the preset frequency. Transponder 30 is preset to receive test signals from three dimensional radar 31 and reply on a specific frequency corresponding to a given angle of elevation. Referring now to FIG. 4 which shows the transponder 30 in more detail...

... signal from the pre-tuned oscillator 34 which may be pre-tuned for a particular test . The resultant output signal is the pulse signal at the IF frequency which is fed...

... FIG. 2). Range delay 40 should be preset to a particular range for a given test . The output signal from range delay unit 40 is used to key modulator 42. Pre...

... as a low frequency crystal oscillator, a phase comparator 62, necessary filters 64, a voltage control oscillator 66 and a feedback loop 68 which consist of a presetable counter. The value...

... 68 will be dependent upon the value of the reference frequency 60 and the voltage control oscillator frequencies as well as frequency increments necessary for generating the elevation scan loops, structure...

... by a given frequency it must also have the capability of being updated as the ship 's attitude changes.

Obviously many modifications and variations of the present invention are possible in...

1. In a three dimensional radar test system for testing three dimensional radars mounted on board a ship or other moving platforms the combination comprising:
a. a three dimensional radar for transmitting test signals;
b. transmitter means located on the ship on which the three dimensional radar is located for transmitting signals representing the ship 's attitude and the position of the radar antenna with respect to the ship ;
c. transponder means located on shore and having first antenna receiving means for receiving signals...

... the received signals from said transmitting means to simulate a target for the radar being tested .

2. The test system of claim 1 wherein said transmitter means includes converter means for converting the ship 's pitch, roll, and antenna

3. The system of claim 1 wherein said transponder comprises...

...said three dimensional radar, a second input and an output;

b. a local oscillator being controlled by the signals received from said transmitting means, and having its output coupled to the...
...frequency

5. The system of claim 4 wherein said frequency synthesizer comprises:
a. a voltage controlled oscillator;
b. a reference oscillator;
c. a phase comparator having a first input coupled to said reference oscillator, a second input and an output coupled to said voltage controlled oscillator;
d. a feedback loop coupled from the output of said voltage controlled oscillator to the second input of said phase comparator for providing a control voltage to said voltage controlled oscillator when there is a

6. The system of claim 4 wherein said feedback loop is a preset counter controlled by the signals transmitted by said transmitting means.

3/3,KWIC/5 (Item 5 from file: 652)
DIALOG(R)File 652:US Patents Fulltext

00643851
Utility
VEHICLE NAVIGATION SYSTEM

PATENT NO.: 3,749,893
ISSUED: July 31, 1973 (19730731)
INVENTOR(s): Hileman, Dale, 3387 Livonia Way, Los Angeles, CA (California), US (United States of America), 90034
Assignee Code(s): 68000|
APPL. NO.: 5-210,804
FILED: December 22, 1971 (19711222)
FULL TEXT: 837 lines

PATENT NO.: 3,749,893
ISSUED: July 31, 1973 (19730731)

... the east-west and north-south motions of the plotting device are angularly offset by angles equal, but opposite, the angles by which the east-west and north-south plots depart from the X and Y...
...switches by the vehicle drive shaft.

The compass 10 is comprised of a rotating magnetic sensor 20 which may be a Hall-effect semi-conductor device, or any other magnetic field sensitive device, such as a simple loop of wire as shown, to periodically sweep the earth...

... zero-crossover detector 23. That detector may be a Schmitt trigger circuit or other level sensitive or phase sensitive circuit that will change a sinusoidal signal to a pulse having a fixed time relationship to the azimuth of the sensor 20. For example, the pulse produced may be adjusted to occur when the plane of a loop sensor is passing either a magnetic north heading or a true north heading by a phase...

... to correct for magnetic declination or by an adjustment of the relative angular positions of sensor 22 and shaft encoder 25.

The filter 22 is used to remove undesired signals from the sinusoidal output of the sensor 20. It is shown as a separate functional block, but

will in practice be implemented...

...of the amplifier in the usual manner. The amplifier 21 may be coupled to the sensor 20 through a slip ring, but to avoid commutating noise, an inductive coupling is preferred...

...are well known in the art may also be employed.

A motor 24 drives the sensor 20 and a shaft encoder 25 through a suitable gear box 26 or other drive mechanism. By relating the phase of the sinusoidal signal from the sensor 20 to a 6-bit code from the encoder 25, the resolver 11 effectively receives...

... example, suppose the zero-crossover detector 23 generates a pulse once per rotation of the sensor , i.e. once per cycle of the sinusoidal signal from the sensor ; the 6-bit code read out of the shaft encoder 25 at that time will...

...is read at the end of the next cycle of the sinusoidal signal from the sensor 20.

It should be noted that a 5-bit heading code would be sufficient for... resolving a distance vector from a polar coordinate system to a Cartesian coordinate system for angles from 0 degree(s) to 180 degree(s). The ambiguity in the Y component is...
... having a distinct null period in each cycle of the pulse generator encoder for system test purposes.

If the 1's, 2's, 4's(A) and 4's(B) were...

... be replaced by integrating pulse counters for digital position read-out for transmission to a control station. If a plotting device is used, such an integrating counter may be used, but...straight road, the output from the compass shaft encoder may be effectively phase modulated to simulate electronically the effect of the driver weaving back and forth across a straight path. That...

...with a low frequency sinusoidal signal from an oscillator 30 (FIG. 1) to modulate the sensor signal in the zero-crossover detector 23 so that part of the time the output...

...along a heading of 0 degree(s). However, when the output signal from the compass sensor is phase modulated by +- 5 degree(s) 37' 30" the pulse from the zero-crossover... varied, so that the phase relationship of the encoder shaft to the shaft of the sensor 20 may be continually advanced and retarded by 5 degree(s) 37' 30". The same...
... filter 22 which will cause a cyclic phase shift in the output signal from the sensor 20. In short, any scheme by which the phase relationship of the sensor shaft to the heading encoder shaft is made to oscillate periodically will produce the desired...

... heading error. That may even take the form of some resilinent coupling in either the sensor shaft or the encoder shaft with a "hard spot" in each revolution of the shaft...1. In that manner the first two columns of the compass shaft encoder output will control the direction of the X and Y motors according to the sign of the DELTA...

... negative going for northerly headings and positive going for southerly headings, all under the simple control of the first two digits of the heading code through the direct control of the transistors Q sub 1 and Q

sub 2. Other motor reversing circuit arrangements...

...F of Table I are decoded by nine AND gates 71 through 79 to obtain control signals for selectively inhibiting the gates 51 to 54 and 61 to 64 through two...

... motor drives a pulse generator 89, such as a cam operated switch, and the magnetic sensor (loop) 20. The pulse from the generator 89 resets the counter 85 once per revolution of the sensor . The heading code thus produced by the counter is effectively read into the buffer flip...

... the counter is arranged to count up from zero to, for example, 360 (assuming the sensor is rotated counter clockwise) so that the heading code read out at any given time...

...example, if the vehicle is on a magnetic heading of 30 degree(s), as the sensor is rotated counter clockwise from the position at which the counter is reset to zero, the counter will count 30 pulses before the sensor passes through magnetic north. A pulse from the zero-crossover detector then reads out the...

...of 30 degree(s). This assumes that the motor 87 is adapted to cause the sensor to complete one revolution in 360 cycles of the oscillator 86. That can be assured by the proper use of gears (not shown) between the motor 87 and the sensor .

An advantage of this arrangement is that, when parallel logic is employed to implement the...

...time so that no ambiguity can occur if the heading is read out as the sensor crosses from one ...state, and never while changing state.

The count of 360 pulses per revolution of the sensor is, of course, arbitrary. For greater heading resolution, twice that many, or ten times that...

... counts from zero to eight and back to zero during each half revolution of the sensor 20, and by the use of suitable logic networks, the code of Table I may...

...sub 2 (FIG. 5). The sine signals would replace the B and A signals which control the inverting and noninverting functions of the transistors.

For most efficient implementation, the heading decoder...

... degree(s) in a manner that is standard for compensating a magnetic compass on a ship . However, the procedure takes a considerable time, and must be repeated from time to time...

... plotting device can be adjusted to produce a rectangular plot by offsetting the cursors by angles equal and opposite to angles by which the sides of the rhomboid depart from a rectangle, as illustrated in FIG...
... chains, or slipping the chains on the pulleys, until the cursors are at the proper angle with respect to the X and Y axes. For the exemplary rhomboid shown in FIG...the axis of rotation for the compass to depart from a substantially vertical position. The roll angle of a vehicle does not normally vary as much as the pitch angle , but for greater accuracy the magnetic compass should be pivoted about the roll axis also...

... produce a commutator signal or code. That signal or code is made

proportional to the pitch angle , and may therefore be used to further multiply the X and Y train of pulses by the cosine of the pitch angle .

To further improve performance of the system, the magnetic sensor 20 may be mounted at the end of flexible pole made of stainless steel, fiberglass, or the like, thus locating the sensor as far as possible from the magnetic influence of the vehicle. Other improvements, modifications and...
...vertical line = DELTA D vertical line cos theta vertical line
where theta is the heading angle represented by said code bits C, D . . . , DELTA D is the number of pulses produced...

... DELTA Y includes decoding means responsive to said code bits C, D . . . representing the heading angle theta for producing codes representing the values of vertical line sin theta vertical line and...DELTA D sin theta
DELTA Y = DELTA D cos theta
where theta is the heading angle represented by said code, DELTA D is the number of pulses produced by said pulse...

...vertical line = DELTA D vertical line cos theta vertical line

where theta is the heading angle represented by said code bits C, D . . . , DELTA D the number of pulses produced by...

... DELTA Y includes decoding means responsive to said code bits C, D . . . representing the heading angle theta for producing codes representing the values of vertical line sin theta vertical line and...

... around two pulley at least one of which is driven, said cursors being adjustable in angle relative to X and Y axis of said plotting device through said drive chains to...D cos theta

where DELTA D is an increment of distance traveled, theta is the angle represented by said heading signal, and DELTA X and DELTA Y are said two signals...

... magnetic headings, a rhomboid is plotted, and adjusting said cursors in said plotting device at angles with respect to X and Y axes thereof equal but opposite in direction to angles by which corresponding sides of said rhomboid depart from lines parallel to said X and...

3/3,KWIC/6 (Item 6 from file: 652)

DIALOG(R)File 652:US Patents Fulltext

00628763

Utility

GYROSCOPIC BORESIGHT ALIGNMENT SYSTEM AND APPARATUS

PATENT NO.: 3,731,543
ISSUED: May 08, 1973 (19730508)
EXTRA INFO: Assignment transaction [Reassigned], recorded January 23, 1989 (19890123)
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INVENTOR(s): Gates, Robert L., Littleton, CO (Colorado), US (United States of America)
ASSIGNEE(s): The Singer Company, (A U.S. Company or Corporation), Little Falls, NJ (New Jersey), US (United States of America)

Assignee Code(s): 77120I
APPL. NO.: 5-221,694
FILED: January 28, 1972 (19720128)
FULL TEXT: 382 lines

PATENT NO.: 3,731,543
ISSUED: May 08, 1973 (19730508)
...positioned on the carrier flight deck, or in the carrier hangar, and the boresight alignment test of its equipment is conducted while the carrier is at sea. In order to conduct the test , a master sensor unit 12 and a remote sensor unit 14 are mounted on the aircraft, and these units are connected to an electronics unit 16 which, in turn, is connected to a remote display/ control unit 18. The units 12, 14, 16 and 18 form the system of the invention. The master sensor unit 12 includes two gyroscopes designated 20 and 22 positioned as shown in FIG. 2B; whereas the remote sensor unit 14 includes a single gyroscope 24, positioned such as shown in FIG. 2A.

The master sensor unit 12 includes an adapter to permit it to be attached in a precisely aligned...

...on the part of the aircraft 10 which defines the armament data line. The remote sensor unit 14, on the other hand, is equipped with different adapters to permit its attachment...

... gun sights, rocket launch rails, camera assemblies, and the like, whose boresights are to be tested for angular misalignments.

The master sensor unit 12 and the remote sensor unit 14 are preferably individually temperature controlled , and the input axes of the individual gyroscopes are aligned with appropriate reference pads to...

...accuracy of less than 30 arc seconds, for example. The input axes of the master sensor 12 and remote sensor 14 are aligned with the respective roll input axis (A), pitch input axis (B) and...

...A in FIG. 2A defines the boresight axis.

As shown in .FIG. 3, the master sensor unit supplies three outputs (omega sub R), (omega sub B) and (omega sub Y) to the electronics unit 16, whereas the remote sensor 14 supplies two outputs (omega sub R sub') and (omega sub Y sub') to the...

... sub R), (theta sub P) and (theta sub Y) to the display unit 18. Appropriate test buttons designated 17, 19 and 21 in FIG. 3 are provided at any appropriate location, so as to permit the operator to test selectively for misalignments with respect to each of the three axes. For example, the pushbutton 17 is pressed to test for misalignments with respect to the roll axis (theta sub R); the pushbutton 19 is depressed to test for misalignments with respect to the pitch axis (theta sub P), and the pushbutton 21 is actuated to test for misalignments with respect to the yaw axis (theta sub Y).

The electronics unit 16...

... serves to provide the usual power and excitation to the gyroscopes, as well as temperature control , rate capture loops, and the like. This assembly is not shown since it may be...

... actuation of the respective pushbuttons 17, 19 and 21 to cause the

system selectively to test for the above-mentioned various misalignments about the different axes. The electronics unit 16 also...criteria table illustrated in FIG. 5.

For example, when the pushbutton 17 is depressed to test for boresight misalignments with respect to the roll axis, the integrators 68 and 72, as ...

...axis (theta sub R) to be made.

Likewise, when the pushbutton 19 is depressed, to test misalignments with respect to the pitch axis (theta sub P), the integrators 68 and 72, as well as the conversion circuitry 52 is disabled until the test conditions shown in the column " Test theta sub P " of the block 50 in FIG. 4, and shown in the table...

...FIG. 5, are met. In the same manner, when the pushbutton 20 is depressed to test misalignments about the yaw axis (theta sub Y), the integrators 70 and 74 are disabled until the criteria shown in the column " Test theta sub Y " of the block 50, as well as in the table of FIG...

... In carrying out the computation, the terms theta sub R and theta sub P are tested initially, and the larger is reduced. The display/ control unit 18, for example, optically displays the three error signals theta sub R, theta sub...

... angular rates of the aircraft carrier to measure misalignments of the boresight axis. The master sensor unit 12 serves as a reference rate gyroscope with orthogonal input axes. As shown in FIGS. 1 and 2B, the master sensor unit is mounted so that one axis (A) defines the aircraft theoretical roll axis (armament...

... and so that a third axis (C) defines the aircraft theoretical yaw axis. The remote sensor unit 14, on the other hand, is mounted on a remote station of the aircraft...

... Consider first the case where the roll and yaw rate input axes of the remote sensor unit are exactly parallel to the respective roll and yaw rate input axes of the master sensor unit. Then, if the components of the carrier's angular velocity about the roll and yaw axes are compared in the master and sensor units, the rates will be identical. Under such conditions, if the signal outputs of the parallel pair of axes of the master and remote sensor units are differenced, the rate of the carrier will be implicitly cancelled and any residual...

...trimmed to be as nearly zero as possible.

Now consider the case where the remote sensor unit 18 is mounted on a boresight which is misaligned with respect to the armament data line, such that a misalignment occurs for the remote sensor unit 14 with respect to the master sensor unit 12 about the yaw axis (C). The resulting differenced outputs of the pitch rates...

... two units 12 and 14 will be directly proportional to the sine of the misalignment angle . Since the pitch rate is measured in real time by the sensor unit 12, the misalignment angle may be computed and displayed directly. The logic system 50, as described above, prevents confusion between the roll and pitch alignment errors.

The assumption is made that for small angles sine theta congruent theta and cos (90 degree(s) - theta) congruent 1 for non-parallism...

... 2A and 2B, the rate equations, ignoring drift terms, may be written as follows:

Master Sensor Remote Sensor
omega sub R = OMEGA sub R
omega sub R = OMEGA sub R + theta sub Y...

... theta sub R,P,Y = misalignment of Remote gyro axes with respect to the Master Sensor triad about Roll, Pitch and Yaw
OMEGA sub R,P,Y = ship 's angular velocity vector as resolved into the Master triad about Roll, Pitch and Yaw...one of the rates is sufficiently small so that its product with the (theta) misalignment angle is negligible. Additionally, the other orthogonal term present for the measured axis must be large...

...to smooth gyroscopic noise to less than 0.02 degree(s) per hour.
The misalignment angle of interest is computed and displayed following the one second sample, for example:

.theta..sub...

... as follows, with the primed terms designating drift of the gyroscope 24 in the remote sensor unit 18:

.omega..sub.R - .omega..sub.R = .theta..sub.Y .OMEGA..sub.P - .theta
...

... trimming on a day-to-day basis. At the beginning of a series of boresight tests with the equipment of the invention, the remote sensor 18 initially is preferably directly mounted on the master sensor 12, so that the error terms (theta sub P), (theta sub R) and (theta sub...

...s) /hour are required along with a minimum carrier rate of 200 degree(s) /hours. Ship motion data is available to support such a requirement. A specific error analysis is as...

...mr)

Analog Computation Scale Factor Error (measuring intermediate 5 min angle)	1%	0.01	3
		TOTAL (RSS)	
		0.5	103

the invention provides, therefore, an improved and relatively simple system...

...at sea with no constraints as to space, aircraft location, or heading of the carrier vessel . The equipment required in the system of the invention is relatively compact, and does not...

...be operated by medium skilled personnel, since it displays magnitude and sign of the misalignment angle directly, and does not require any particular operational calculations. Moreover, there is no need to...

... course, that although the system of the invention has been described in conjunction with the testing of carrier-based aircraft, the system may be used in conjunction with aircraft, or any other equipment, to test alignments of the axes of any equipment with respect to a data reference

line. All...
... means for producing angular rates, such as described in the preceding specification, so as to simulate the angular rates of the carrier.

While a particular embodiment has been shown and described...
... in claim 1, in which said first sensor unit includes two gyroscopes positioned at right angles to one another and having orthogonal input axes corresponding respectively to the roll, pitch and...
?

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S PD<=031230 AND ANGLE? AND (SIMULAT? (S) SENS?) AND (CONTROL? (S) (VESSEL? OR SHIP?

Your SELECT statement is:
   S PD<=031230 AND ANGLE? AND (SIMULAT? (S) SENS?) AND (CONTROL? (S)
(VESSEL? OR SHIP? OR BOAT?))

           Items   File
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>>>File 14 processing for PD=  : PD=031230
>>>File 14:     started at PD=APR.0000 stopped at PD=19830300
               1    14: Mechanical and Transport Engineer
                        Abstract_1966-2006/Sep
>>>File 34 processing for PD=  : PD=031230
>>>File 34:     started at PD=15 stopped at PD=20011011
               4    34: SciSearch(R) Cited Ref Sci_1990-2006/Sep W4
>>>File 63 processing for PD=  : PD=031230
>>>File 63:     started at PD=DATED stopped at PD=19680517
               1    63: Transport Res(TRIS)_1970-2006/Aug
>>>File 95 processing for SENS? stopped at SENSORPRUEFUNGEN
               2    95: TEME-Technology & Management_1989-2006/Sep W4
               1    96: FLUIDEX_1972-2006/May
       Examined  50 files
>>>File 324 processing for PD=  : PD=031230
>>>File 324:     started at PD=19650805 stopped at PD=20030821
>>>File 324 processing for SENS? stopped at SENSORGEHAEDSE
              41   324: German Patents Fulltext_1967-200638
>>>File 340 processing for PD=  : PD=031230
>>>File 340:     started at PD=19490329 stopped at PD=19840705
               3   340: CLAIMS(R)/US Patent_1950-06/Sep 28
Processing
>>>File 348 processing for PD=  : PD=031230
>>>File 348:     started at PD=78 stopped at PD=960103
>>>File 348 processing for SENS? stopped at SENSORANSTEUERZEITSIGNAL
              43   348: EUROPEAN PATENTS_1978-2006/ 200638
>>>File 349 processing for SENS? stopped at SENSIERUNQ
>>>File 349 processing for CONTROL? stopped at CONTROLLEF
              46   349: PCT FULLTEXT_1979-2006/UB=20060928UT=20060921
               3   370: Science_1996-1999/Jul W3
               1   441: ESPICOM Pharm&Med DEVICE NEWS_2006/Apr W2
             114   652: US Patents Fulltext_1971-1975
>>>File 654 processing for PD=  : PD=031230
>>>File 654:     started at PD=A stopped at PD=19821124
>>>File 654 processing for SENS? stopped at SENSORSS
             133   654: US Pat.Full._1976-2006/Sep 28

   13 files have one or more items; file list includes 80 files.
   One or more terms were invalid in 52 files.
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